

THE WARBLER

AN EDUCATIONAL WEEKLY

ISSUE

89

DECEMBER 22, 2021

Dear Student, Artist, Thinker,

Sleep: a period of rest, replenishing our bodies, clearing our minds away. Aside from making us feel better, scientists also believe that a certain amount of bodily reconstruction is able to occur during **sleep**. However, this “restorative” theory is only one that scientists hold among others like “energy conservation,” stating that humans can only hold their body temperature and caloric demand for so many hours in the day before requiring rest, or the “brain plasticity” theory, hypothesizing that sleep is so crucial because this is the time where changes in structure and organization to the brain occur. Even changing an hour from our normal sleeping schedule can have major impacts to our body. In the springtime, with the incoming of daylight-saving time when we lose an hour of sleep, some people experience insomnia as they adjust. Aside from the ascribed benefits of sleeping, this is one of our natural impulses such as hunger or the need to breathe that is impossible to ignore. Even going one day without sleep can apply a mind-numbing slowness to our thought process and fill our limbs with sand. The longest period recorded of a human going without sleep was Randy Gardner, who was a high school student looking to impress at his science fair so much that he stayed awake for 11 days straight.

However, for some staying constantly awake appears to be their dream. American writer Edgar Allan Poe once said, “Sleep, those little slices of death — how I loathe them.” Even with Poe’s often macabre viewpoint on life, he reflects the idea many people have of sleep simply being a period of inactivity; that there is so much of life to be experienced, that to take ourselves out of it each day is simply a waste.

Although, whether you view sleep as a peaceful break away from our regular working lives or as a human weakness to be hated, we all must succumb to our natural urge to sleep. We hope you enjoy learning about the phenomenon of sleep and can uncover some new discoveries about this simple process we indulge in everyday (or in Gardner’s case, every 11 days).

Julia and the APAEP team

WORDS INSIDE

FOUND INSIDE “THE SCIENCE BEHIND DREAMING”

ponder | think about something carefully, especially before making a decision or reaching a conclusion

prophetic | accurately describing or predicting what will happen in the future

enhance | intensify, increase, or further improve the quality, value, or extent of

FOUND INSIDE “BRAINS SWEEP THEMSELVES CLEAN ...”

circulate | move or cause to move continuously or freely through a closed system or area

plaque | an ornamental tablet that is fixed to a wall or other surface in commemoration of a person or event; a sticky film of bacteria

tantalize | torment or tease someone with the sight or promise of something that is unobtainable

...

“How hard it is to sleep in the middle of life?”

AUDRE LORDE // American writer and activist



ALABAMA PRISON ARTS + EDUCATION PROJECT

The Warbler, an educational newsletter compiled of materials from the Internet, was created during the COVID-19 global pandemic as a free resource for people who are incarcerated. All works are credited, and efforts have been made to exclude material that has copyright restrictions for educational use. Articles have been edited due to space restrictions.

SCIENCE

The Science Behind Dreaming

BY SANDER VAN DER LINDEN | *Scientific American* | July 26, 2011

For centuries people have pondered the meaning of dreams. Early civilizations thought of dreams as a medium between our earthly world and that of the gods. In fact, the Greeks and Romans were convinced that dreams had certain prophetic powers. Many theories and hypotheses have been proposed about dreaming

Since then, technological advancements have allowed for the development of other theories. Given the vast documentation of realistic aspects to human dreaming as well as indirect experimental evidence that other mammals such as cats also dream, evolutionary psychologists have theorized that dreaming really does serve a purpose. In particular, the “threat simulation theory” suggests that dreaming should be seen as an ancient biological defense mechanism that provided an evolutionary advantage because of its capacity to repeatedly simulate potential threatening events – enhancing the neuro-cognitive mechanisms required for efficient threat perception and avoidance.

So, over the years, numerous theories have been put forth in an attempt to illuminate the mystery behind human dreams, but, until recently, strong tangible evidence has remained largely elusive.

Yet, new research published in the *Journal of Neuroscience* provides compelling insights into the mechanisms that underlie dreaming and the strong relationship our dreams have with our memories. Cristina Marzano and her colleagues at the University of Rome have succeeded, for the first time, in explaining how humans remember their dreams. The scientists predicted the likelihood of successful dream recall based on a signature pattern of brain waves. In order to do this, the Italian research team invited 65 students to spend two consecutive nights in their research laboratory.

During the first night, the students were left to sleep, allowing them to get used to the sound-proofed and temperature-controlled rooms. During the second night the researchers measured the student’s brain waves while they slept. Our brain experiences four types of electrical brain waves: “delta,” “theta,” “alpha,” and “beta.” Each represents a different speed of oscillating electrical voltages and together they form the electroencephalography (EEG). The Italian research team used this technology to measure the participant’s brain waves during various sleep-

stages. (There are five stages of sleep; most dreaming and our most intense dreams occur during the REM stage.) The students were woken at various times and asked to fill out a diary detailing whether or not they dreamt, how often they dreamt and whether they could remember the content of their dreams.

While previous studies have already indicated that people are more likely to remember their dreams when woken directly after REM sleep, the current study explains why. Those participants who exhibited more low frequency theta waves in the frontal lobes were also more likely to remember their dreams. These findings suggest that the neurophysiological mechanisms that we employ while dreaming (and recalling dreams) are the same as when we construct and retrieve memories while we are awake.

In another recent study conducted by the same research team, the authors used the latest MRI techniques to investigate the relation between dreaming and the role of deep-brain structures. In their study, the researchers found that vivid, bizarre and emotionally intense dreams (the dreams that people usually remember) are linked to parts of the amygdala and hippocampus. While the amygdala plays a primary role in the processing and memory of emotional reactions, the hippocampus has been implicated in important memory functions, such as the consolidation of information from short-term to long-term memory.

Taken together, these recent findings tell an important story about the underlying mechanism and possible purpose of dreaming.

Dreams seem to help us process emotions by encoding and constructing memories of them. What we see and experience in our dreams might not necessarily be real, but the emotions attached to these experiences certainly are. Our dream stories essentially try to strip the emotion out of a certain experience by creating a memory of it. This way, the emotion itself is no longer active. This mechanism fulfils an important role because when we don’t process our emotions, especially negative ones, this increases personal worry and anxiety. In fact, severe REM sleep-deprivation is increasingly correlated to the development of mental disorders. In short, dreams help regulate traffic on that fragile bridge which connects our experiences with our emotions and memories. ●



“We are such stuff as dreams are made on; and our little life is rounded with a sleep.”

WILLIAM SHAKESPEARE // English playwright

● Edited for space

BIOLOGY

Brains Sweep Themselves Clean of Toxins During Sleep

BY JON HAMILTON | *National Public Radio* | October 17, 2013

While the brain sleeps, it clears out harmful toxins, a process that may reduce the risk of Alzheimer's, researchers say.

During sleep, the flow of cerebrospinal fluid in the brain increases dramatically, washing away harmful waste proteins that build up between brain cells during waking hours, a study of mice found.

"It's like a dishwasher," says Dr. Maiken Nedergaard, a professor of neurosurgery at the University of Rochester and an author of the study in *Science*.

The results appear to offer the best explanation yet of why animals and people need sleep. If this proves to be true in humans as well, it could help explain a mysterious association between sleep disorders and brain diseases, including Alzheimer's.

Nedergaard and a team of scientists discovered the cleaning process while studying the brains of sleeping mice.

The scientists noticed that during sleep, the system that circulates cerebrospinal fluid through the brain and nervous system was "pumping fluid into the brain and removing fluid from the brain in a very rapid pace," Nedergaard says.

The team discovered that this increased flow was possible in part because when mice went to sleep, their brain cells actually shrank, making it easier for fluid to circulate. When an animal woke up, the brain cells enlarged again and the flow between cells slowed to a trickle. "It's almost like opening and closing a faucet," Nedergaard says. "It's that dramatic."

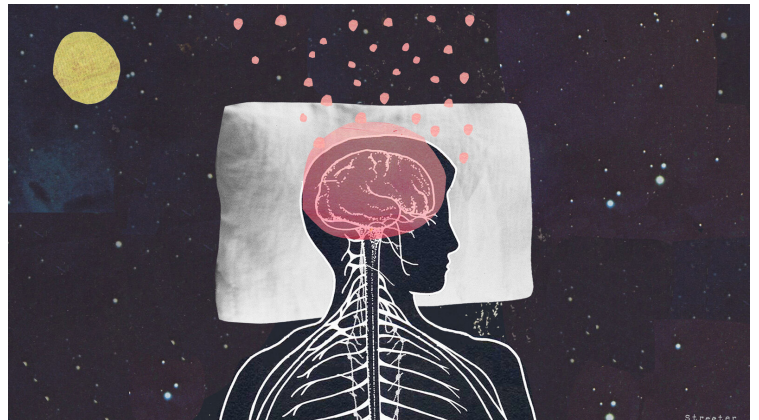
Nedergaard's team, which is funded by the National Institute of Neurological Disorders and Stroke, had previously shown that this fluid was carrying away waste products that build up in the spaces between brain cells.

The process is important because what's getting washed away during sleep are waste proteins that are toxic to brain cells, Nedergaard says. This could explain why we don't think clearly after a sleepless night and why a prolonged lack of sleep can actually kill an animal or a person, she says.

So why doesn't the brain do this sort of housekeeping all the time? Nedergaard thinks it's because cleaning takes a lot of energy. "It's probably not possible for the brain to both clean itself and at the same time [be] aware

of the surroundings and talk and move and so on," she says.

The brain-cleaning process has been observed in rats and baboons, but not yet in humans, Nedergaard says. Even so, it could offer a new way of understanding human brain diseases including Alzheimer's. That's because one of the waste products removed from the brain during sleep is beta amyloid, the substance that forms sticky plaques associated with the disease.



That's probably not a coincidence, Nedergaard says. "Isn't it interesting that Alzheimer's and all other diseases associated with dementia, they are linked to sleep disorders," she says.

Researchers who study Alzheimer's say Nedergaard's research could help explain a number of recent findings related to sleep. One of these involves how sleep affects levels of beta amyloid, says Randall Bateman, a professor of neurology at Washington University in St. Louis who wasn't involved in the study. "Beta amyloid concentrations continue to increase while a person is awake," Bateman says. "And then after people go to sleep that concentration of beta amyloid decreases. This report provides a beautiful mechanism by which this may be happening."

The report also offers a tantalizing hint of a new approach to Alzheimer's prevention, Bateman says. "It does raise the possibility that one might be able to actually control sleep in a way to improve the clearance of beta amyloid and help prevent amyloidosis that we think can lead to Alzheimer's disease." ●

Image by Katherine Streeter for NPR

MATHEMATICS

Sudoku

#177 PUZZLE NO. 6198936

3				9				
			6					
		8	7		1			
7				6				4
		2		5			1	
4		9					5	3
	2		3			8		
						6		7
		1	2		6			

©Sudoku cool

#178 PUZZLE NO. 269238

	8	4	5		9	2		
	9					1		
				6	1			9
	3						4	5
		7			6		1	
9	4					8	3	
			1		8			
7								
				9	4	6		

SUDOKU HOW-TO GUIDE

1. Each block, row, and column must contain the numbers 1–9.
2. Sudoku is a game of logic and reasoning, so you should not need to guess.
3. Don't repeat numbers within each block, row, or column.
4. Use the process of elimination to figure out the correct placement of numbers in each box.
5. The answers appear on the last page of this newsletter.

BOX											BLOCK																			

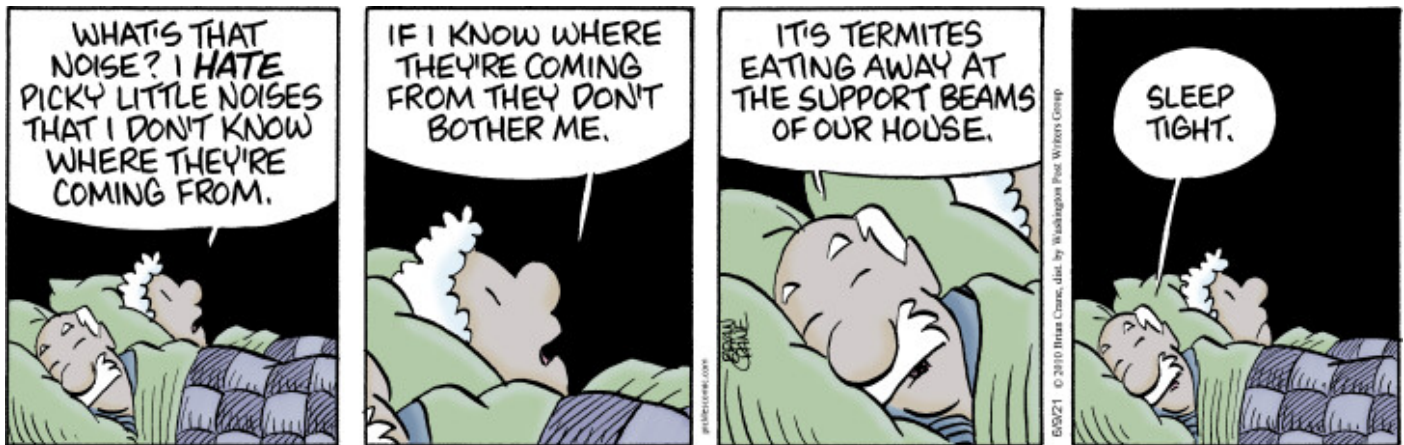
What the example will look like solved

2	4	8	3	9	5	7	1	6
5	7	1	6	2	8	3	4	9
9	3	6	7	4	1	5	8	2
6	8	2	5	3	9	1	7	4
3	5	9	1	7	4	6	2	8
7	1	4	8	6	2	9	5	3
8	6	3	4	1	7	2	9	5
1	9	5	2	8	6	4	3	7
4	2	7	9	5	3	8	6	1



“When action grows unprofitable, gather information; when information grows unprofitable, sleep.”

URSULA K. LE GUIN // American author



©Brian Crane. All rights reserved.

DID YOU KNOW?

Research shows that in the days leading up to a **full moon**, people go to bed later and sleep less, although the reasons are unclear.

One job in early English mill and factory towns was to **knock on people's windows** to wake them up for work.

We are the **only mammals** that willingly delay sleep.

Sea otters **hold hands** when they sleep so they don't drift away from each other.

English bulldogs are the only canines known to experience **sleep apnea**, a breathing disorder. Their unusual airway anatomy (short snouts and underbites) is likely the reason.

Source: <https://health.clevelandclinic.org/22-facts-about-sleep-that-will-surprise-you/>

“It is better to sleep on things beforehand than lie awake about them afterwards.”

BALTASAR GRACIAN // Spanish writer and philosopher

“The only time I have problems is when I sleep.”

TUPAC SHAKUR // American rapper and actor

“Sleep is that golden chain that ties health and our bodies together.”

THOMAS DEKKER // American actor

Idiom

“Counting sheep”

Meaning The mental distraction of imagining a field of sheep and counting them is intended to distract insomniacs from fretting about being awake and relax into sleep.

Origin We have evidence of this particular technique, of counting sheep as they are imagined in a field or jumping a fence, being used from at least 1854. That's from Seba Smith's *Way down East; or Portraits of Yankee life*:

“He shut his eyes with all his might, and tried to think of sheep jumping over a wall.”

Source: www.phrases.org.uk/meanings/103375.html



WHALES AND DOLPHINS LITERALLY **FALL HALF ASLEEP**. EACH SIDE OF THEIR BRAIN TAKES TURNS SO THEY CAN COME UP FOR AIR.

ART + CULTURE

Dreams

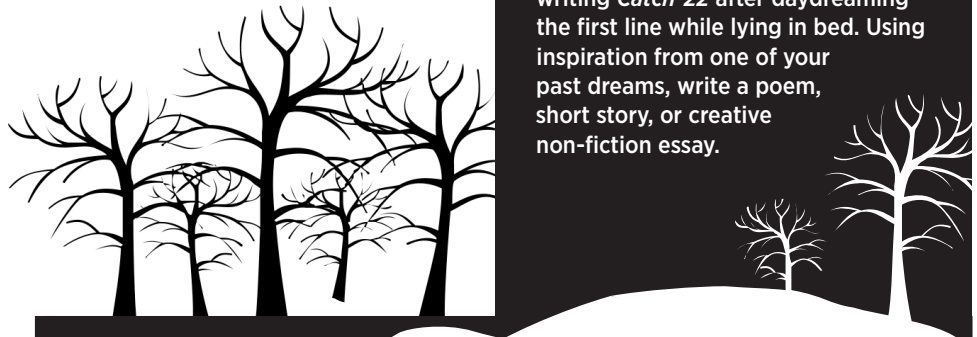
BY LANGSTON HUGHES

Hold fast to dreams
For if dreams dies
Life is a broken-winged bird
That cannot fly.

Hold fast to dreams
For when dreams go
Life is a barren field
Frozen with snow.

WRITING PROMPT

Although sleep is meant as an individual's break away from work, many writers have been able to draw great inspiration from their dreams. Mary Shelley conceived of the story of *Frankenstein* after waking from a nightmare about a reanimated corpse, and Joseph Heller began writing *Catch-22* after daydreaming the first line while lying in bed. Using inspiration from one of your past dreams, write a poem, short story, or creative non-fiction essay.



Word Search

A poet, novelist, fiction writer, and playwright, Langston Hughes is known for his insightful, colorful portrayals of black life in America from the twenties through the sixties and was important in shaping the artistic contributions of the Harlem Renaissance.

N	C	S	L	O	G	L	A	W	A	E	L	S	O
D	L	I	G	T	A	M	A	E	R	D	O	E	R
E	A	E	A	M	A	S	R	E	G	N	I	F	O
G	S	A	D	D	A	A	G	G	N	S	L	N	D
G	P	E	G	A	N	E	W	A	V	E	O	A	S
I	F	E	O	I	F	F	N	W	L	L	N	L	N
S	E	O	L	W	L	A	D	W	C	S	T	H	G
O	R	E	D	E	O	S	D	R	N	E	N	D	P
G	W	S	E	E	W	E	R	O	H	S	N	D	E
L	F	S	N	P	N	R	S	V	S	D	V	O	A
R	R	E	D	S	N	E	A	O	O	H	H	P	G
W	I	D	N	N	I	G	H	T	D	S	W	W	S
G	L	D	A	E	E	C	D	R	R	O	R	N	N
N	D	N	S	S	W	P	P	W	O	S	D	F	S

SHORE
GOLDEN
WAVE
FLOWN
NIGHT
SAND
FINGERS
GONE
CLASP
DREAM
WEEP

ANIMAL SCIENCE

Jellyfish Don't Have Brains, But They Do Sleep

BY STEPHANIE PAPPAS | *Live Science* | September 21, 2017

They don't have brains, or even anything more than a rudimentary nervous system, but jellyfish apparently do have bedtimes.

New research finds that jellyfish enter a sleep-like state. If the study, published today in the journal *Current Biology*, is confirmed by future studies, jellyfish are the first-ever animals with no central nervous system to have been observed sleeping. That finding could bolster the theory that sleep is an emergent property of neurons — in other words, sleep might be something that nerve cells connected in a network just do, even without complex organization.

Snoozing jellies

Micheal Abrams and Ravi Nath joined forces with Claire Bedbrook to investigate just what the jellies were doing. They knew that to show that the jellyfish were sleeping, they'd have to prove that their behavior met the standard criteria for sleep: decreased activity that is rapidly reversible, unlike a coma or unconsciousness; reduced responsiveness to stimuli compared to a waking state; and homeostatic regulation, meaning there is some sort of innate "drive" toward sleep and that the animal needs sleep to function.

To measure activity, the researchers counted the rate of the bell's pulsation in 23 jellyfish for six straight days and nights. They found that the rate dropped by 32 percent at night, going from about 1,155 pulses per 20 minutes during the day to 781 pulses per 20 minutes at night. When the researchers put a little midnight snack in the water column, the jellies perked up and started pulsing at daytime rates, indicating that this quiescent period was easily reversible.

But were the jellyfish less responsive than usual? To find out, the researchers put the jellyfish into small containers made of PVC pipe with a mesh bottom. They raised the jellies gently up from the bottom of the tank, then rapidly yanked the container downward, leaving the jellyfish suspended in the water.

Cassiopea jellies prefer sitting to swimming, so the suspended jellies pulsed their way down to the tank floor. But they did so much faster during the day, starting to pulse by 2 seconds after losing their resting surface, than they did at night, when it took them about 6 seconds to start pulsing — almost as if they were groggily shaking off sleep before they could react.

Next, the researchers tested whether the sleepy behavior in jellyfish was under homeostatic control. Put more simply, the question was: Would jellies act tired the next day if they were deprived of their quiescence at night? To find out, the researchers blew gentle pulses of water at the jellies for 10 seconds every 20 minutes. They found that when they disturbed the jellyfish this way during the last 6 hours of the night, the jellyfish showed a 12 percent decline in pulsing in the first 4 hours of the next day, as if they were having trouble waking up. When the researchers continued the disturbances all night, the jellyfish were 17 percent less active over the entire next day. After a full night without any disturbances, the jellyfish returned to normal activity levels the following day.

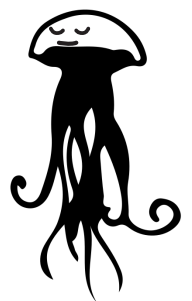
Evolution of sleep

One burning question is whether the sleep-like behavior in jellyfish is the same kind of behavior that eventually gave rise to the complex sleep of higher animals. Researchers do know that the same genes and molecules that control sleep in worms and flies also regulate sleep in zebrafish and humans, Nath said. The researchers weren't able to look for those genes and molecules in this study, but they did dose the jellyfish's water with melatonin and the anti-histamine pyrilamine, two substances that make humans drowsy. The jellyfish, too, became less active in the presence of these substances, suggesting that the sleep state in the oldest known animals and in humans might have the same biological roots.

"If this is something that is conserved in what we observe in other invertebrates, vertebrates or humans, then what is the common denominator?" Bedbrook said. "What do they all have in common that could be the reason these animals go through this sleep state?"

The next step, Nath said, might be to use electrodes to track the activity of the jellyfish's neurons during the sleep-like state.

"We'd love to see whether there are other species of jellyfish that also sleep," Bedbrook added. "We would also like to see whether or not sponges, the next level down, sleep." Sponges don't have nervous systems at all, though they do possess some of the rudimentary genes and proteins found in other animals' nervous systems. ●



✎ Edited for space and clarity

FEATURE

What I Wish People Knew About Narcolepsy

BY HARLING ROSS | *Repeller* | July 26, 2017

I was diagnosed with narcolepsy when I was 17, during my final year of high school. The symptoms had been escalating for a few years, but at that point I was falling asleep in class and in the middle of exams, so I started thinking, “Okay, maybe this isn’t normal.”

I had mixed feelings when I got the diagnosis. It felt validating to a certain extent, because for years and years I thought I just wasn’t doing life right. I was sleeping much longer at night than any of my friends, but I still couldn’t stay awake during the day. I couldn’t study properly. I couldn’t socialize. I felt like I was failing as a person. When I was diagnosed, I was relieved all these things weren’t actually my fault, but it was also a big thing to wrap my head around. Narcolepsy has no cure. There was a bit of a grief element to accepting it. I grieved the loss of the life I imagined for myself, the things I wanted to achieve.

Extreme daytime sleepiness was one of the first symptoms I experienced. It’s different from how people imagine it, though (i.e. instantly falling asleep, face-first into a bowl of soup or something). It’s more like overwhelmingly bad jet lag. Like you can’t possibly stay awake, no matter how hard you try.

I also have cataplexy, another typical symptom of narcolepsy. In a normal sleep cycle, there’s a stage called REM sleep, which is when you dream. During REM, your brain paralyzes your body so you can’t physically act out your dream, but if you have cataplexy, your brain paralyzes you when you’re still awake. Stuff like laughter or intense anger often triggers the paralysis because your brain interprets those intense emotions as dreams. My main trigger is laughter, but only certain kinds. Watching a funny TV show doesn’t affect me. It’s more of an anticipation type thing, like when I want to say something I think is really funny, or if I’m talking with a friend and we get into a loop where we keep making each other laugh over and over again. That’s the worst.

I used to hallucinate, which is common as well with narcolepsy. Since being diagnosed and getting treated, I don’t as much anymore, thank god. Some people think hallucinations sound cool, but they’re never cool. They’re terrifying. One time, I could feel something underneath my bed pushing up against my mattress, pulling my sheets off my bed, even though I was literally lying there, looking at my sheets, and I

could see they weren’t moving. But I could feel them moving. It’s a weird, weird sensation.

I take medication to manage all of these symptoms. During the day, I take powerful stimulants (for comparison, a cup of coffee would be like a drop in the ocean), which help me stay awake for a few hours at a time. At night, I take a sedative, which allows me to get proper deep and restful sleep. The thing most people don’t realize about narcolepsy, and why a lot of people don’t take it very seriously, is that while narcoleptics might sleep more than the average person, our sleep is never actually *restful*. Medication is the only thing that can properly regulate my sleep phases. Without it, I would feel permanently sleep-deprived.

Learning how to nap effectively has been really important for me. It was a tough thing to get my head around at first; I have a full-time job as a graphic designer, and it feels counterintuitive to just drop everything I’m working on and go to sleep. But if I try to force my way through the sleepiness and stay awake, I’ll end up wasting hours, because my brain is half asleep anyways, so I have to be disciplined with myself. I’m very lucky to work for a small business, where the environment is pretty casual. Our team is only five people, and they all understand my situation, so I never feel weird about it. There’s a spare office where I have my own little nap area set up.

Sometimes people think it sounds so nice to nap all the time but I have to tell them it’s actually not nice at all. I’m only doing it out of necessity. My naps aren’t even particularly restful but my brain wouldn’t be able to function without them.

Maintaining a social life can be tough because it’s just another thing that takes up energy. I know that



Photo by Louisiana
Mei Gelpi;
Creation Direction
by Emily Zirimis

sounds really sad, but the reality is that narcolepsy isn't the kind of illness that just "flares up." It's always there. I'm always thinking about it.

I've learned that it's really not worth pushing myself to do stuff when I'm tired because it wouldn't be much fun anyways. When I see my friends, I want to feel present, so if that means seeing them less and saving my energy for the stuff I actually want to do instead of saying yes to every little thing, I think that's okay. Quality over quantity! My friends understand, so that's nice.

Before my diagnosis, people would make comments about how I needed to pull myself together and "stop being so lazy." I was quite depressed as a teenager because I was often made to feel like I wasn't trying hard enough. I still struggle with the stigma, always questioning if I'm actually too tired to do something or if I just think I'm too tired because I have narcolepsy. More often than not, I really am too tired. There's such a premium on productivity these days, to the point that over-tiredness has become almost glamorized. People brag about not getting enough sleep and driving themselves the point of exhaustion. It's taken a lot of time and effort for me to finally accept that not only do I need rest — I deserve it. Being exhausted isn't cool. Taking care of myself is cool.

My involvement in the narcolepsy community has really helped me get to where I am now. Narcolepsy is a rare condition (only 0.05 percent of the population are affected by it — one in 2,000 people), so I don't just fortuitously bump into other people who have it. The feeling that part of it was my fault and I should just be "trying harder" didn't go away until I got to know other people who were having the exact same experience. It put everything in perspective. I finally accepted that my inability to accomplish certain things has nothing to do with me as a person; it's simply the result of medical condition I happen to have.

Social media has been an incredible outlet as well. I make a point to try and put all my emotions out there on Instagram and my website, good and bad, so other people with narcolepsy might feel less alone. Sometimes I worry that it seems like I'm always complaining, or that it won't be relatable to other people, but then I get comments from other narcoleptics who tell me how much it's helped.

I'm a naturally shy person, so I'm always trying to push myself further out of my comfort zone. I know I am privileged compared to many other people with narcolepsy; I am fortunate that my treatment works quite well for me

and that I come from an understanding and supportive family. I have the money to access the things I need. I feel a responsibility to be a voice for those who don't have one, and if that means being open about what medications I'm taking, or how I'm managing my anxiety, so be it. Being vulnerable on the internet can feel intimidating sometimes, especially since I'm talking about something a lot of people don't understand. But after hallucinating a ghost under my mattress, it takes a lot to scare me. ●

Edited
for space

RANDOM-NEST

The Stages of Sleep

BY CHRIS BRANTNER | SLEEP CYCLE | FEB 2, 2019

STAGE 1 | The first stage of sleep, known as **light stage sleep**, is one of the shortest, lasting five to ten minutes on average. In this stage, the mind and body begin to 'slow down,' causing us to feel drowsy and relaxed. Light sleep is also when it's easiest to wake up.

STAGE 2 | In the second stage of sleep, **still referred to as light sleep**, eye movement, brain waves, and muscle activity start to decrease and prepare the mind for deep sleep. During this stage, the brain produces sudden spikes in brain waves known as sleep spindles for their spindly appearance on EEG charts. These spikes in brain activity are thought to play a role in long term memory consolidation and sensory processing, making this an important stage as we age. It is believed that it is during this stage that most of our memories are formed.

STAGE 3 AND 4 | During the third and fourth stages of sleep, **slow wave sleep**, we become much more difficult to wake up. The muscles of the body become fully relaxed or 'limp' in this stage, and breathing rate, blood pressure, and body temperature all decrease significantly during these stages. The body produces growth hormones, regulates immune system function, and develops and repairs muscle tissue during these stages, making them critical for physical health and recovery.

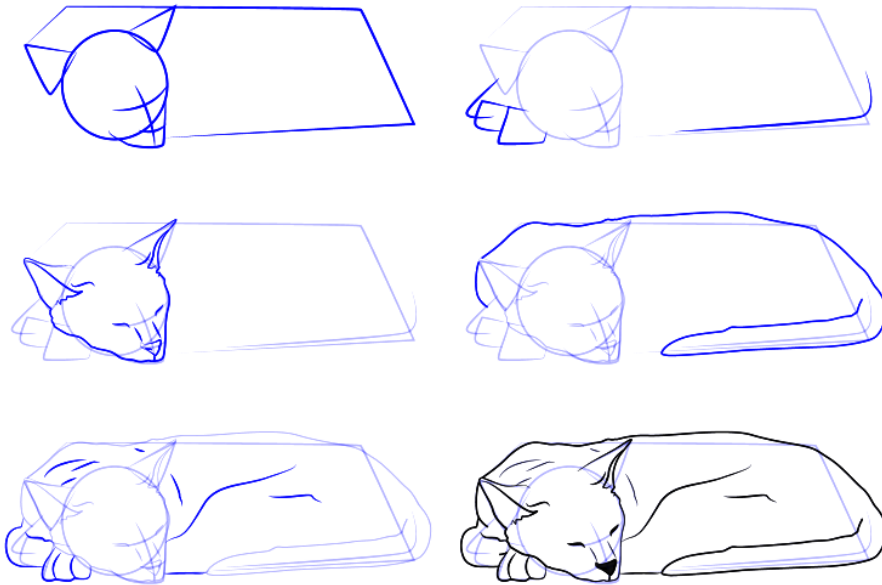
STAGE 5 | After these stages, the body enters the most talked-about phase of sleep: the **REM phase**. During this phase, we experience dreams, but also a host of neurological and physiological responses which are similar to being awake. During REM sleep, heart rate and blood pressure increase, while breathing can become irregular, fast, and shallow.

REM sleep is somewhat mysterious, and its full function is still being studied by neuroscientists. However, it is believed that REM sleep plays a vital role in the brain's ability to learn and remember since it is during REM sleep that the brain processes, consolidate, and stores information into long-term memory.

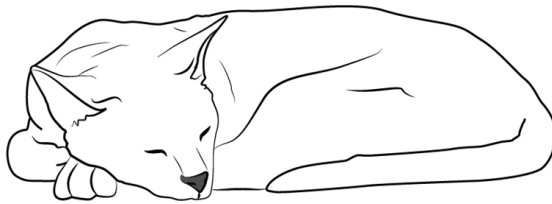


WORD PLAY A Rebus puzzle is a picture representation of a common word or phrase. How the letters/images appear within each box will give you clues to the answer! For example, if you saw the letters "LOOK ULEAP," you could guess that the phrase is "Look before you leap." *Answers are on the last page!*

HOW TO DRAW A SLEEPING CAT



PRRRRRRRRRRR



DrawingTutorials101.com



WORDS OF ENCOURAGEMENT

We often think of sleep as synonymous with rest, but I think we should reframe that. Rest is not simply a bodily task in the way that sleep is. I'm not discounting how important sleep is for the mind and body, but I am pointing to the importance of finding ways to rest that are not sleep. I personally find rest in conversation. I find it comforting to talk about things that matter to me. Others might find this exhausting though. Meditation is one way that we may rest spiritually. We could find rest in prayer, or we could find it in something such as reading. Some of you might feel some degree of rejuvenation from reading this. Rest might be redefined as living in the moment. Taking a moment to breathe or relax would be restful, and in doing this, you stop attending to your surroundings. This week, I hope that you find the time to allow yourself to let go of your frustrations and stress for a moment and rest your mind and body. I hope you found this edition of *The Warbler* to be a pleasant read and that you'll have a great week.

Taylor



1061 Beard-Eaves Memorial Coliseum // Auburn University, AL 36849

Answers

SUDOKU #177

3	4	6	5	9	8	1	7	2
1	9	7	6	2	4	5	3	8
2	5	8	7	3	1	4	6	9
7	1	5	9	6	3	2	8	4
8	3	2	4	5	7	9	1	6
4	6	9	8	1	2	7	5	3
6	2	4	3	7	5	8	9	1
5	8	3	1	4	9	6	2	7
9	7	1	2	8	6	3	4	5

SUDOKU #178

1	8	4	5	3	9	2	6	7
3	9	6	8	2	7	1	5	4
2	7	5	4	6	1	3	8	9
6	3	1	9	8	2	7	4	5
8	5	7	3	4	6	9	1	2
9	4	2	7	1	5	8	3	6
4	6	9	1	7	8	5	2	3
7	2	8	6	5	3	4	9	1
5	1	3	2	9	4	6	7	8



Rebus Puzzle

Page 9

1. Forgive and forget
2. Wait in vain
3. Get up and go

Send ideas and comments to:

APAEP
1061 Beard-Eaves
Memorial Coliseum
Auburn University, AL 36849

UNTIL NEXT TIME !